

What is claimed is:

1. A one- or multi-stage, continuous or batchwise process for preparing mono-, di- and/or polyamines from compounds having carbodiimide groups by hydrolysis with water.

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2. The process of claim 1,

wherein

the compounds having carbodiimide groups which are used are (poly)carbodiimides which are prepared from (poly)isocyanates, (poly)isocyanate derivatives or 10 (poly)isocyanate homologues having aliphatic or aromatic isocyanate groups.

3. The process of at least one of the preceding claims,

wherein

the compounds having carbodiimide groups which are used are (poly)carbodiimides 15 which are prepared from the polyisocyanates selected from 1,4-diisocyanatobutane, 1,6-diisocyanatohexane (HDI), 1,12-diisocyanatododecane, 1,4-diisocyanatocyclohexane, 1-isocyanato-5-isocyanatomethyl-3,3,5-trimethylcyclohexane (IPDI), bis(4-isocyanato-cyclohexyl)methane (H12MDI), 1,3-bis(1-isocyanato-1-methyl)benzene (XDI), 1,3-bis(1-isocyanato-1-methylpropyl)benzene (m-TMXDI), 2,4-diisocyanatotoluene (TDI), bis(4-isocyanatophenyl)methane (MDI), 1,6-diisocyanato-2,2,4(2,4,4)-trimethylhexane 20 (TMDI), or isomers thereof, higher homologues thereof and/or technical-grade mixtures of the individual polyisocyanates.

4. The process of at least one of the preceding claims,

25 wherein

(poly)carbodiimides are used which have been modified with groups of isocyanate chemistry.

5. The process of claim 4,

30 wherein

(poly)carbodiimides are used which have been modified with groups of isocyanate chemistry, selected from aromatic, cycloaliphatic, (cyclo)aliphatic or aliphatic (poly)carbodiimides which have been modified with urethane, isocyanate, amine, amide, (iso)urea, biuret, isocyanurate, uretdione, guanidine, formamidine, oxamidine, 5 imidazoline, uretonimine and/or allophanate groups.

6. The process of at least one of the preceding claims,

wherein

reaction is effected with an amount of water which is sufficient at least for the hydrolysis 10 of the carbodiimide bonds and any groups of isocyanate chemistry which are also to be converted.

7. The process of at least one of the preceding claims,

wherein

15 the amount of water used is at least 2 mol of water per mole of carbodiimide group and a corresponding amount for the conversion of any additionally present groups of isocyanate chemistry.

8. The process of claim 7,

20 wherein

the amount of water used is from 5 to 100 times the stoichiometric amount, preferably from 5 to 80 times, more preferably 10 times the stoichiometric amount, based on the stoichiometric amount of water required to convert the carbodiimide groups and any additionally present groups of isocyanate chemistry.

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9. The process of at least one of the preceding claims,

wherein

reaction is effected with an acidic or basic, heterogeneous or homogeneous catalyst or mixtures of acidic or basic, heterogeneous or homogeneous catalysts.

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10. The process of at least one of the preceding claims,

wherein

reaction is effected at a temperature of from 0 to 400°C.

11. The process of claim 10,

5 which

is carried out at temperatures of from 150 to 300°C.

12. The process of at least one of the preceding claims,

wherein

10 reaction is effected at a pressure of from 0 to 500 bar.

13. The process of claim 12,

which

is carried out at a pressure of from 20 to 150 bar.

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14. The process of at least one of the preceding claims,

wherein

the mono-, di- and/or polyamines formed are worked up by separation processes selected from distillation, crystallization, extraction, sorption, permeation, phase separation or
20 combinations thereof.

15. The process of at least one of the preceding claims,

wherein

reaction is effected with or without solvent.

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16. The process of claim 15,

wherein

the solvent or solvent mixture used comprises alcohols, preferably those alcohols which are formed in the hydrolysis of any urethane groups also present.

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17. The process of at least one of the preceding claims,

wherein

the working pressure is the vapor pressure of the reaction mixture which is established at reaction temperature.

5 18. The process of at least one of the preceding claims,

wherein

carbon dioxide formed in the process is removed from the reaction mixture continuously or discontinuously, optionally using a stripping gas, preferably nitrogen.

10 19. The process of at least one of the preceding claims,

which

is carried out continuously or batchwise in reactor systems selected from stirred tank reactors, flow tube reactors, fluidized bed reactors, fixed bed reactors, bubble columns, reactive distillation reactors, microreactors or combinations or batteries of the reactors mentioned.

15 20. The process of at least one of the preceding claims,

wherein

polyamines selected from 1,4-diaminobutane, 1,6-diaminohexane, 1,12-diaminododecane, 1,4-diaminocyclohexane, 1-amino-5-aminomethyl-3,3,5-trimethylcyclohexane (IPDA), bis(4-aminocyclohexyl)methane (H12MDA), 1,3-bis(1-amino-1-methyl)benzene (XDA), 1,3-bis(1-amino-1-methylethyl)benzene (m-TMXDA), 2,4-diaminotoluene (TDA), bis(4-aminophenyl)methane (MDA), 1,6-diamino-2,2,4(2,4,4)-trimethylhexane (TMDA) and where appropriate isomers, higher homologues and technical-grade mixtures of the individual polyamines are prepared.